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Loneliness and Self-Management Abilities in the Visually Impaired Elderly

Manna A. Alma, Sijrike F. Van der Mei, W. Nathalie Feitsma, Johan W. Groothoff, Theo G. Van Tilburg and Theo P. B. M. Suurmeijer

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Abstract

Objectives: To describe the degree of loneliness among the visually impaired elderly and to make a comparison with a matched reference group of the normally sighted elderly. In addition, we examined self-management abilities (SMAs) as determinants of loneliness among the visually impaired elderly. **Method:** In a cross-sectional study, 173 visually impaired elderly persons completed telephone interviews. Loneliness and SMAs were assessed with the Loneliness Scale of De Jong Gierveld and the SMAS-30, respectively. **Results:** The prevalence of loneliness among the visually impaired elderly was higher compared with the reference group (50% vs. 29%; $p < .001$). Multivariate hierarchical regression analysis showed that the SMA self-efficacy, partner status, and self-esteem were determinants of loneliness. Severity and duration of visual impairment had no effect on loneliness. **Discussion:** The relationship between SMAs (i.e., self-efficacy)

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and loneliness is promising, as SMAs can be learned through training. Consequently, self-management training may reduce feelings of loneliness.

Keywords

loneliness, self-management, low vision, well-being, elderly

The prevalence of visual impairment increases exponentially above the age of 50 (Limburg, 2007). A recent study in the Netherlands has reported a prevalence rate of 10.2% for visual impairment (visual acuity <0.3 Snellen) in the elderly aged 65 and above (Limburg, Keunen, & Van Rens, 2009). The majority (79%) of the total number of visually impaired persons are 65 years and above (Limburg et al., 2009). Due to the aging of the population and a longer life expectancy, the prevalence of impaired vision is expected to increase in the future (Horowitz, 2004; Limburg, 2007).

Previous research reported that visual impairment had a profound impact on the daily life and functioning of visually impaired people (Iecovich & Isralowitz, 2004; Lamoureux, Hassell, & Keeffe, 2004; West et al., 2002) as indicated by impaired functional ability, psychosocial problems (Evans, Fletcher, & Wormald, 2007; Hayman et al., 2007; Tolman, Hill, Kleinschmidt, & Gregg, 2005), participation restrictions in daily life such as mobility outside the home (Hassell, Lamoureux, & Keeffe 2006), social isolation (Wallhagen, Strawbridge, Shema, Kurata, & Kaplan, 2001), and feelings of loneliness (Verstraten, Brinkmann, Stevens, & Schouten, 2005).

Loneliness is an unpleasant experience, encompassing a lack of (quality of) certain relationships, which results in a decrease of well-being (De Jong Gierveld, 1998). It is well known that poor vision is associated with loneliness (Barron, Foxall, Von Dollen, Jones, & Shull, 1994; Evans, 1983; Foxall, Barron, Von Dollen, & Jones, 1992; Verstraten et al., 2005). Prevalence rates of loneliness in visually impaired persons, however, vary. A study among blind American veterans (mean age 62 years) found that 20% reported feelings of loneliness according to the UCLA Loneliness Scale (Evans, 1983). In contrast, a Dutch study among new elderly clients (aged ≥ 55 years) of a low-vision rehabilitation center found that 54% reported loneliness according to the Loneliness Scale of De Jong Gierveld (Verstraten et al., 2005).

Knowledge about the determinants of loneliness is needed to prevent or reduce feelings of loneliness. Determinants of loneliness in the general population of the elderly include general health problems (Havens, Hall, Sylvestre, & Jivan, 2004; Hawkey et al., 2008; Penninx et al., 1999; Tijhuis, De Jong

Gierveld, Feskens, & Kromhout, 1999), widowhood (Havens et al., 2004; Savikko, Routasalo, Tilvis, Strandberg, & Pitkala, 2005), living alone (Havens et al., 2004; Savikko et al., 2005), a small social network (Green, Richardson, Lago, & Schatten-Jones, 2001; Hawkey et al., 2008), a lack of social support (De Jong Gierveld, 1998), and reduced self-esteem (Van Baarsen, 2002). Studies among the visually impaired elderly have shown that duration of visual impairment (Evans, 1983), adaptation to vision loss (Verstraten et al., 2005), a lack of social support (Verstraten et al., 2005), a small supporting social network (Barron et al., 1994), activity loss (Evans, 1983), and personality characteristics (Foxall et al., 1992) are determinants of feelings of loneliness.

Self-management, which becomes more important as age increases, is considered as an important social skill and is expected to play an important role in explaining differences in feelings of loneliness in visually impaired elderly persons. To our knowledge, no studies among visually impaired people are available with respect to the relationship between self-management abilities and loneliness. Relevant in this respect may be the self-management well-being theory (SMWT) of Steverink, Lindenberg, and Slaets (2005). Although this theory is intended to explain differences in well-being, it may also apply to other outcome measures, such as feelings of loneliness. Moreover, loneliness is often considered to be an indicator of lack of well-being (De Jong Gierveld, 1998; Hughes, Waite, Hawkey, & Cacioppo, 2004; Korporaal, Broese van Groenou, & Van Tilburg, 2008).

According to this SMWT (Steverink et al., 2005), two kinds of resources can be distinguished. The first one encompasses external resources which contribute to well-being from the "outside" such as friends and social support. The second one encompasses internal resources which refer to behavioral and cognitive abilities that people use to manage their external resources and thus achieve well-being. Having external resources is essential but not sufficient for the maintenance of well-being. People also need to be able to manage these external resources (Steverink et al., 2005). For example, having social relationships requires the management ability to indeed achieve and maintain social support from these relationships. Steverink et al. (2005) introduced the term *self-management abilities* (SMAs) to represent these internal resources, which were identified as self-efficacy, positive frame of mind, taking initiatives, investment behavior, multifunctionality of resources, and variety in resources.

SMAs may be particularly important for the visually impaired elderly. Along with the general consequences of aging, these elderly will experience additional restrictions due to vision loss and, as such, will be doubly burdened (Heyl & Wahl, 2001). Due to vision loss, the management of external

resources (e.g., friends, social support) may become more difficult. As a result, they may experience feelings of loneliness. The application of SMAs may be able to support the visually impaired elderly in managing a decline in these external resources, which accordingly will enable them to experience well-being and fewer feelings of loneliness. Interindividual differences in the way visually impaired older adults proactively cope with feelings of loneliness may be attributed to discrepancies in the degree and extent to which they are able to apply SMAs.

In this study, we will focus on two specific SMAs: self-efficacy and taking initiatives. Self-efficacy is a cognitive SMA and refers to the ability to gain and to maintain a belief in personal competence or control in achieving various aspects of well-being (Steverink et al., 2005). The higher a person's self-efficacy belief with respect to obtaining external resources, the more likely it will be that the person will undertake those activities and apply the effort needed to do so. However, a high self-efficacy belief is not sufficient. Even if people feel efficacious, they do need to take specific actions to achieve desired results. Therefore, an active-motivational SMA such as taking initiatives is essential (Steverink et al., 2005). The SMA taking initiatives refers to the ability to be self-motivating or proactive as opposed to being or feeling passive, dependent, or fatalistic. It is hypothesized that taking initiatives with regard to important resources is necessary for the achievement and maintenance of well-being (Schuurmans et al., 2005; Steverink et al., 2005). The two SMAs self-efficacy and taking initiatives have been chosen because of their considerable contribution to the overall concept of self-management (Schuurmans et al., 2005). Moreover, these abilities are expected to be important for coping with feelings of loneliness.

The first aim of this study is to identify the degree to which visually impaired elderly persons experience feelings of loneliness as compared with their non-visually impaired peers. A second aim is to examine the SMAs self-efficacy and taking initiatives as determinants of loneliness among visually impaired older adults.

Method

Study Population

An age stratified sample ($N = 350$) was drawn from 786 newly registered clients of Royal Dutch Visio, a low-vision rehabilitation center, between July 1, 2006 and June 30, 2007. Inclusion criteria were (a) aged ≥ 55 years; (b) able to speak Dutch; (c) able to understand instructions concerning response

sets; and (d) referred to a low-vision rehabilitation center according to the “Guidelines on the referral of visually impaired persons to low-vision services” (De Boer, Langelaan, Jansonius, & Van Rens, 2005). According to these evidence-based guidelines of the Dutch Society of Ophthalmology, persons with a visual acuity <0.3 Snellen and/or visual field <30 degrees in the better eye should be referred for rehabilitation to a low-vision rehabilitation center. In addition, persons with a visual acuity ≤ 0.5 Snellen who experience problems with reading or other daily-life activities due to visual impairment and who have a well-defined request for help should be referred to a low-vision rehabilitation center as well. Participants were excluded when they had a mental disorder (e.g., dementia), a hearing impairment, or if they were hospitalized. From this sample, a total of 264 persons were eligible for participation in the study and 173 persons agreed to participate (response 66%). Nonresponse analyses showed that study participants (M age = 72.3 years; $SD = 9.7$) were younger than nonresponders (M age = 78.5 years; $SD = 9.7$; $t(262) = -5.0$, $p < .001$). No difference was found with respect to gender ($p = .45$). For the nonresponders for whom the reasons for refusal were known ($n = 62$), the major reasons for refusal were: the interview takes too long or is expected to be too tiresome (32%), a lack of interest (31%), health problems (18%), a lack of time (10%), and other reasons (10%). For the remaining nonresponders ($n = 29$), the reasons for refusal were unknown.

Design and Procedure

Data for this cross-sectional study were collected by means of telephone interviews performed by experienced interviewers who received an additional training session. Prior to the interview participants gave their informed consent. The study design was reviewed by the Medical Ethics Review Committee of the University Medical Center Groningen.

Reference Population

The Longitudinal Aging Study Amsterdam (LASA; Deeg, Van Tilburg, Smit, & de Leeuw, 2002) was used as a reference population to address the first aim of this study, that is, to compare the prevalence of loneliness among visually impaired versus normally sighted elderly persons. LASA is a longitudinal multidisciplinary study which focuses on predictors and consequences of aging. In 1992, a first cohort included 3,107 persons aged 55 to 85 years. The sample was based in three culturally distinct geographical areas in the west, northeast, and south of the Netherlands and included middle- to large-size

cities as well as rural municipalities. A second cohort of 1,002 participants (aged 55 to 64 years) started in 2002 to be able to distinguish between age, cohort, and period effect. Every 3 years, the participants are reexamined. Data from the follow-up measurement in 2005-2006 of both cohorts were used for the present study ($N = 1,805$; age range: 57-97 years). LASA participants who reported difficulties with seeing ($n = 225$), hearing ($n = 413$), or with both ($n = 180$) were excluded for analysis. To preclude confounding, the reference group was frequency-matched on age, gender, and partner status ($n = 258$).

Measures

Loneliness. Loneliness is a situation experienced by an individual, where there is an unpleasant or inadmissible lack of (quality of) certain relationships (De Jong Gierveld, 1998). Loneliness was assessed by the 11-item Loneliness Scale (De Jong Gierveld & Kamphuis, 1985; De Jong Gierveld & Van Tilburg, 1999). Examples of items are "There is always someone I can talk to about my day-to-day problems" and "I miss having a really close friend." Response categories are "yes," "more or less," and "no." Item scores were dichotomized in agreement with the scaling procedure; the response "more or less" indicates loneliness. The Loneliness Scale score was computed as the sum of the dichotomized items, ranging from 0 (*absence of loneliness*) to 11 (*extreme loneliness*). A Loneliness Scale score of 3 or higher is considered as the presence of loneliness (Van Tilburg & De Jong Gierveld, 1999). The Cronbach's alpha (α) for the scale was .86.

Sociodemographic Variables. The following sociodemographic characteristics were assessed: age, gender, and educational level as an indicator of socioeconomic status (International Standard Classification of Education [ISCED]; United Nations Educational, Scientific and Cultural Organization, 2006).

Physical Status

Vision-related variables. Self-perceived vision was measured with the single-item subscale General Vision from the Visual Functioning Questionnaire (VFQ-25; Mangione et al., 2001). The question was "At the present time, would you say your eyesight using both eyes (with glasses or contact lenses) is excellent, good, fair, poor, very poor, or are you completely blind?" According to the manual, the subscale was coded and transformed to a score ranging from 0 to 100, with a higher score indicating better vision ($M = 40.1$ [$SD = 18.8$]). Duration of vision loss was computed by subtracting self-reported age at onset of vision loss from a participant's age. Data with respect to the degree of visual impairment, as indicated by corrected binocular visual acuity at distance (VODS), were collected from medical files available at the low-vision

rehabilitation centers of Visio such as the referral form of the treating ophthalmologist of the hospital. If this form was unavailable, the report of the optometrist at Visio was used. Visual acuity values were transformed to log-MAR values ($-\log$ visual acuity).

Health-related variables. The General Health Perceptions subscale of the RAND-36 (Hays, Sherbourne, & Mazel, 1993; Van der Zee & Sanderman, 1993) was used to assess the subjective evaluation of the participant's general health. This subscale consists of five items. Sample items are "In general, would you say your health is excellent, very good, good, fair, or poor?" and "I am as healthy as anybody I know." The raw scale score was converted to a 0-100 scale, with a higher score indicating a better subjective evaluation of the participant's health. A lower score indicates an evaluation of the participant's general health as poor and likely to become worse ($M = 54.2$ [$SD = 22.7$]; $\alpha = .77$). To assess comorbidity, participants were asked by means of an open-ended question to list all chronic conditions they were suffering from other than their eye disease. The number of conditions reported was used as a comorbidity variable (median = 1).

Social Status. To identify the extent of the ego-centered social network, study participants were requested to indicate the number of individuals within the four different networks of children, relatives, friends, and neighbors. An example of the items is "With how many of your children do you have regularly contact, that is face-to-face contact, contact by telephone, mail or e-mail?" The size of the social network was established by summing the extent of the four networks ($M = 20.5$ [$SD = 13.4$]). Partner status was a nominal variable with two categories: having a partner whether they were living together and not having a partner.

Psychological Status. Self-esteem, defined as a person's overall evaluation or appraisal of his or her own worth, was measured by the Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1965), which consists of 10 items, 5 positively stated and 5 negatively stated. Examples of items are "I feel that I have a number of good qualities" and "All in all, I am inclined to feel that I am a failure." Response categories range from 1 (*strongly agree*) to 4 (*strongly disagree*). The total scale scores ranged from 10 to 40 with higher scores indicating more self-esteem ($M = 30.6$ [$SD = 4.7$]; $\alpha = .85$).

Self-Management Abilities. The Self-Management Ability Scale (SMAS-30 [version 1, 2004]; Schuurmans et al., 2005) was used to measure the SMAs self-efficacy and taking initiatives. Sample items from the self-efficacy subscale are "Are you able to find agreeable activities?" and "Are you able to have friendly contacts with others?" Sample items from the taking initiatives subscale are "How often do you take the initiative to get in touch with people who are dear to you?" and "How often do you take the initiative to keep

yourself busy?" Both subscales consist of five items and response categories range from 1 (*never*) to 6 (*very often*). Scale scores range from 5 to 30, with higher scores indicating having more SMAs (self-efficacy: $M = 20.6$ [$SD = 3.9$]; $\alpha = .74$; taking initiatives: $M = 18.7$ [$SD = 4.3$]; $\alpha = .68$).

Statistical Analysis

Student's t tests and chi-square tests were performed for nonresponse analyses within the study group of visually impaired elderly persons. As to the first aim of this study, the prevalence and level of loneliness of the visually impaired were compared with the LASA reference group by using the chi-square test and Student's t test. The significance level was set at .05 (one-sided).

As to the second aim of this study, in the visually impaired study group, a hierarchical regression analysis (balanced design) with loneliness as a dependent variable was conducted. The independent variables were chosen based on relationships described in the literature. To get insight in the association between loneliness and the independent variables at the bivariate level, we computed Pearson's correlation coefficients. For the multivariate hierarchical regression analysis all variables were entered into the model. In determining the sequence of the variables to be entered in this analysis, we followed a biopsychosocial model. Since sociodemographic variables were expected to influence the other independent variables, they were entered in the first step (Block 1). Physical status variables were entered in Block 2 because of the expected effect on social status variables. The social status variables were entered in Block 3 assuming those influenced the psychological status variables that were entered in Block 4. In Block 5, the SMAs self-efficacy and taking initiatives were entered into the model. This final step gives insight in the effect of SMAs on loneliness after controlling for other variables in the biopsychosocial model. The results were checked for multicollinearity which showed that all values were below the critical multicollinearity values (correlation coefficient $<.80$ [Field, 2009]; and variance inflation factor <10 [Kleinbaum, Kupper, Nizam, & Muller, 2008]).

All analyses were performed using the statistical software package SPSS, version 16.0 (SPSS, Inc., Chicago, IL).

Results

Table 1 shows the demographic and clinical characteristics of the study participants.

Table 1. Demographic and Clinical Characteristics of the Visually Impaired Study Participants

Characteristic	Value
	<i>n</i> (%)
Age, year (<i>n</i> = 173)	
55-74	103 (60)
≥75	70 (40)
<i>M</i> ± <i>SD</i>	72.3 ± 9.7
Gender, female (<i>n</i> = 173)	100 (58)
Partner status, partner (<i>n</i> = 161)	83 (52)
Educational level (<i>n</i> = 158)	
(Pre)primary	25 (16)
Lower secondary	47 (30)
Upper secondary	53 (34)
Tertiary	33 (21)
Self-perceived vision (VFQ-25; <i>n</i> = 166)	
<i>M</i> ± <i>SD</i>	40.1 ± 18.8
Excellent or good	8 (5)
Fair	40 (24)
Poor	68 (41)
Very poor	44 (27)
Completely blind	6 (4)
Duration of vision loss (years; <i>n</i> = 165)	
Median	7
Binocular visual acuity (VODS; <i>n</i> = 163)	
Median	0.25
<i>M</i> ± <i>SD</i>	0.75 logMAR ± 0.65 logMAR
Comorbidity (<i>n</i> = 166)	
0	75 (45)
1	56 (34)
≥2	35 (21)
Type of comorbid diseases (<i>n</i> = 165)	
Diseases of the circulatory system	29 (18)
Diseases of the respiratory system	11 (7)
Diseases of the nervous system	9 (5)
Diseases of the vestibular system	8 (5)
Diabetes mellitus	19 (12)
Osteoarthritis	11 (7)
Rheumatoid arthritis	8 (5)
Other chronic conditions	45 (27)

Note: Percentages are based on totals for each category and may not total 100 because of rounding.

The participants' ages ranged from 55 to 93 years ($M = 72$ years). About 52% of the participants had a partner. With respect to vision-related characteristics, the median duration of vision loss was 7 years. The binocular visual acuity ranged from 0.001 to 1.25 (20/20000-20/16; median = 0.25). Five percent of the participants were blind ($VODS < 0.05$). The mean score on the general vision subscale of the VFQ-25 was 40, which corresponds to poor vision. More than half of the participants (55%) had one or more chronic conditions other than their eye disease (range 0-5, median = 1). The mean score on the SMAS-30 self-efficacy subscale was 20.6 ($SD = 3.9$) and the mean score on the taking initiatives subscale was 18.7 ($SD = 4.3$).

Frequency-matching of the LASA population resulted in a reference group of 258 normally sighted elderly persons. The mean age of the reference group was 72 years ($SD = 9.2$). Fifty-seven percent of the reference group were female, and 52% had a partner. There were no differences with respect to age ($p = .75$), gender ($p = .87$), and partner status ($p = .94$) between the LASA reference group and the visually impaired study participants.

Loneliness was present in 50% of the visually impaired study participants. Of those who experienced loneliness ($n = 79$), 14% were extremely lonely (scores 9 through 11) and 86% moderately lonely (scores 3 through 8). Of the normally sighted reference group, 29% experienced loneliness, which is a significantly lower percentage ($p < .001$). The average loneliness score in the study group was 3.3 ($SD = 3.1$) and in the LASA reference group 2.0 ($SD = 2.6$). Visually impaired study participants experienced more feelings of loneliness than the normally sighted reference group (mean difference = 1.3; 95% CI = [0.7, 1.9]).

Table 2 summarizes the correlation matrix for all sociodemographic, physical (i.e., vision-related and health-related), social, and psychological statuses, along with self-management variables with the dependent variable loneliness as measured in the visually impaired study group. Of special interest were the correlations between loneliness and the SMAs self-efficacy and taking initiatives which were statistically significant ($r = -.51$ and $r = -.38$, respectively). These results indicate that at the bivariate level less self-management behavior was associated with more severe feelings of loneliness. Other independent variables that correlated significantly with loneliness were general health perceptions ($r = -.23$), having a partner ($r = -.36$) and self-esteem ($r = -.39$). The correlation between the two SMAs self-efficacy and taking initiatives was .67 ($p < .001$). All other mutual correlations between the independent variables were $\leq .52$.

Table 3 shows the results of the multivariate hierarchical regression analysis with loneliness as the dependent variable. From the analysis, it appears that each block with independent variables entailed a substantive contribution to

Table 2. Correlation Between Independent Variables and the Dependent Variable Loneliness in the Visually Impaired Study Group

Independent variables	Sample size (N)	Loneliness (r)
<i>1. Sociodemographic variables</i>		
Age	161	.13
Gender ^a	161	.04
Educational level	155	-.10
<i>2. Physical status</i>		
<i>2a. Vision related variables</i>		
Self-perceived general vision	161	-.10
Duration of vision loss	160	.08
Degree of visual impairment	151	-.06
<i>2b. Health-related variables</i>		
General health perceptions	161	-.23**
Comorbidity	154	.14
<i>3. Social status</i>		
Social network size	153	-.06
Partner status ^b	160	-.36***
<i>4. Psychological status</i>		
Self-esteem	155	-.39***
<i>5. Self-management abilities</i>		
Self-efficacy	158	-.51***
Taking initiatives	156	-.38***

Note: r = Pearson correlation coefficient.

a. 0 = male, 1 = female.

b. 0 = no partner, 1 = having a partner.

* $p < .05$. ** $p < .01$. *** $p < .001$.

loneliness in visually impaired study participants. The sociodemographic variables accounted for 5.2% of the explained variance (Model 1). Physical status variables accounted for an additional 6.1% of the explained variance (Model 2) and social status variables for 9.8%, respectively (Model 3). Model 4 showed that psychological status variables added 10.2% to the explained variance in loneliness. In the final step (Model 5), the SMAs accounted for an additional 9.8% explained variance. The total variance in loneliness that could be explained by the model was 41.1%.

The standardized regression coefficients of the final model represent the relative contribution of the variables to the explanation of loneliness. Model 5 shows that the SMA self-efficacy had the highest standardized regression coefficient: participants with more self-efficacy experienced fewer feelings of loneliness. Other significant determinants of loneliness were partner status and self-esteem indicating that having a partner and having more self-esteem

Table 3. Multivariate Hierarchical Regression Analysis of Loneliness in the Visually Impaired Study Group

Block	Model 1	Model 2	Model 3	Model 4	Model 5
	β	β	β	β	β
<i>1. Sociodemographic variables</i>					
Age	.18*	.21*	.10	.07	.01
Gender (female)	.02	.05	-.06	-.08	-.04
Educational level	-.12	-.11	-.10	-.08	.02
<i>2. Physical status</i>					
<i>2a. Vision-related variables</i>					
Self-perceived general vision		.02	.00	-.02	-.06
Duration of vision loss		.13	.08	.08	.13
Degree of visual impairment		-.04	.00	-.02	-.06
<i>2b. Health-related variables</i>					
General health perceptions		-.16	-.20*	-.04	.02
Comorbidity		.13	.14	.09	.12
<i>3. Social status</i>					
Social network size			-.03	-.07	-.02
Partner status (partner)			-.35***	-.32**	-.30***
<i>4. Psychological status</i>					
Self-esteem				-.37***	-.19*
<i>5. Self-management abilities</i>					
Self-efficacy					-.41**
Taking initiatives					.01
R ² change (%)	5.2	6.1	9.8	10.2	9.8
Total R ² (%)	5.2	11.3	21.1	31.3	41.1
F	2.27	1.87	3.10**	4.76***	6.06***
N	127	127	127	127	127

Note: β = standardized regression coefficient.

* $p < .05$. ** $p < .01$. *** $p < .001$.

were directly associated with fewer feelings of loneliness. The SMA taking initiatives was not a significant determinant of loneliness.

Discussion

In this study, we identified the prevalence and degree of loneliness among visually impaired elderly persons and made a comparison with a matched reference group of normally sighted elderly persons. In addition, we examined

determinants of loneliness among the visually impaired study participants with a special focus on the SMAs self-efficacy and taking initiatives. These abilities may support the visually impaired elderly in coping with feelings of loneliness. Our study showed that the visually impaired elderly are at risk for loneliness; they experience significantly more loneliness than normally sighted elderly persons. Furthermore, the results showed that the SMA self-efficacy, partner status, and self-esteem were directly associated with loneliness among visually impaired elderly persons. Severity and duration of visual impairment had no effect on loneliness.

We found a high prevalence of loneliness among the visually impaired elderly persons, namely 50% which is in line with another Dutch study (Verstraten et al., 2005) that reports a prevalence of 54% in the visually impaired elderly aged ≥ 55 years using the same Loneliness scale of De Jong Gierveld. These prevalence rates are higher than the prevalence of 20% found among blind American veterans (Evans, 1983). Evans (1983), however, used the UCLA Loneliness scale to assess loneliness which may account for the difference. In our reference population of normally sighted elderly, 29% reported loneliness. Among the general Dutch population, Van Tilburg (2007) found a prevalence of 30%. The significantly lower rate of loneliness in the matched reference group of the LASA study therefore justifies the conclusion that the visually impaired elderly experience more feelings of loneliness than the normally sighted elderly.

The pattern of relationships observed between loneliness and the independent variables suggests that visually impaired elderly persons who have more self-efficacy experience fewer feelings of loneliness. In addition, visually impaired elderly persons who have higher self-esteem and who have a partner report fewer feelings of loneliness, which is consistent with the literature not only in studies on visually impaired people (Verstraten et al., 2005) but also in the general population (Havens et al., 2004; Savikko et al., 2005; Van Baarsen, 2002).

In this study, we were particularly interested in the effect of the SMAs self-efficacy and taking initiatives on loneliness. SMAs are means by which people are able to manage their external resources, such as friends and social support, which are important contributors to well-being (Steverink et al., 2005). Having more SMAs enables people to access these external resources. The exchange of social support within the social network is an important indicator of how well the network functions. More supportive relationships indicate less loneliness (Dykstra, 1993; Van Tilburg, 1990). Therefore, SMAs can be regarded as skills which are necessary to obtain social relationships and social support which may protect elderly persons against feelings of loneliness.

Our results showed that the SMA self-efficacy was the strongest determinant of loneliness. If visually impaired elderly persons have more self-efficacy, they appear to have fewer feelings of loneliness. This result is in accordance with studies among the normally sighted elderly by Fry and Debats (2002) and by Cohen-Mansfield and Parpura-Gill (2007). In contrast, the SMA taking initiatives was not a significant determinant in the multivariate model, although analysis at the bivariate level indicated an association with loneliness. Although both SMAs are closely related, they are considered as separate abilities. The belief in one's competence is not automatically linked to the motivation to use one's competence. Our results indicate that the belief in one's competence or control is more important in proactively coping with feelings of loneliness than is the motivation to use this competence. However, our results do not mean that taking initiatives is an insignificant ability. According to the SMWT of Steverink et al. (2005), SMAs reinforce each other and cumulate to higher levels of self-management.

Interestingly, we found no significant association between loneliness and the vision-related characteristics included in this study (e.g., self-perceived vision, duration of vision loss, and degree of visual impairment). Apparently, merely having a visual impairment is associated with more feelings of loneliness, whereas the severity and the duration of the visual impairment play no additional or significant role within a sample of highly visually impaired persons. Another surprising finding was the lack of a significant association between loneliness and the social network. This is in contrast with previous studies in older adults, which showed that the size and the heterogeneity of the network influenced the exchange of social support and feelings of loneliness (Bondevik & Skogstad, 1998; Dykstra & De Jong Gierveld, 2004; Green et al., 2001; Hawkey et al., 2008; Mullins, Elston, & Gutkowski, 1996). The subjective evaluation of the social network, however, is a mediating factor between the descriptive, objective characteristics of the network, and loneliness (De Jong Gierveld, 1998). Our study only assessed objective characteristics of the social network which may explain the absence of an association with loneliness. Another explanation may be that the effect of social network on loneliness in the visually impaired elderly primarily is mediated by the partner, considering our finding that partner status was an independent determinant of loneliness.

To our knowledge, this is the first study that compares the prevalence and degree of loneliness among the visually impaired elderly with a matched reference group of the normally sighted elderly. In addition, the relationship between SMAs and loneliness in the visually impaired elderly has not been studied before, which is a strength of the present study. However, the cross-sectional

design of the study limits the inferences of causality. Longitudinal research is needed to determine the causal dynamics in adaptation to vision loss as well as to confirm the effects of SMAs. Concerning the generalizability of our findings to the Dutch population of the visually impaired elderly, it should be noted that the present study included the visually impaired elderly who were referred to and registered at a low-vision rehabilitation center. Inclusion through a low-vision rehabilitation center may implicate selection of a subgroup of the visually impaired elderly who are motivated to seek rehabilitation. The response rate of 66% and the fact that nonresponders were older may have resulted in a response bias. Furthermore, missing data resulted in a relatively smaller analytic sample for the regression analysis. An item non-response analysis, however, indicated no differences between persons who were included versus excluded in the regression model with respect to sociodemographic, vision-related, health-related, social status, and psychological status variables, and self-management abilities. Moreover, clinical measures of acuity may be incomplete, as they do not include important other indicators like visual fields and contrast sensitivity. These factors were not examined due to unavailability of these data for all study participants. With respect to the selection of the reference group of the LASA population, we used data on self-perceived vision because of insufficient objective measures of the degree of visual impairment. Last, it would have been interesting to perform a hierarchical regression analysis for the reference group to examine differences in determinants of loneliness between the visually impaired and normally sighted elderly. As the LASA study does not include the measurement of SMAs, this will remain an area for future research.

To conclude, our study showed that visually impaired elderly persons are burdened by the unpleasant feeling of loneliness. This is a profound and worrisome issue in view of the expected increase in the number of visually impaired older adults in the future (Limburg, 2007). The results of this study add new insights into the factors of loneliness. This knowledge can be used in the field of low-vision rehabilitation, in particular in the development of interventions aimed to reduce loneliness. Our results suggest that self-management training may be effective in reducing feelings of loneliness among the visually impaired elderly. Self-management training provides the visually impaired elderly with skills and resources to manage the practical, social, and emotional consequences of vision loss, and as a result may reduce feelings of loneliness. Recent studies have shown that self-management training can enhance the SMAs of the visually impaired elderly (Brody et al., 2002; Girdler, Boldy, Dhaliwal, Crowley, & Packer, 2010). Future studies have to show if the self-management training is effective in reducing loneliness.

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